International Association of Hydrogeologists
U.S. National Chapter
Fall 2020 Newsletter
Editor: Gary Robbins

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Cover Photo: Your editor doing field work in the COVID19 age --mask, gloves and no one within 6 feet. The hat was not required but it was a cold morning. . Photo by M. Higgins

IAH/U.S. NATIONAL CHAPTER: EXECUTIVE COMMITTEE 2017-2018

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A Note from the Chair – *Jim LaMoreaux*

A Note from the Chair – Jim LaMoreaux

With us being about three fourths of the way into the year, we are still looking for the good news. In the interim, the US National Chapter and its Board of Directors hope that everyone and their families, friends and colleagues are staying safe and healthy.

With conferences being cancelled, rescheduled, or going to a virtual format it is even more important to have a means to communicate with one another. Fortunately, we have our newsletter, website (iah-usa.org) and social media to stay connected.

Although the IAH 2020 Congress has been cancelled, we do have exciting news to look forward to. Two international congresses will be held in 2021. Brazil will hold theirs, originally scheduled for this year, and Belgium will proceed with theirs as planned. This is a first and it is also IAH's 65th birthday. What a way to celebrate. Stay tuned for the details. It is hoped that it will be an opportunity for many more people to participate. Go ahead and start making plans now so the USNC can continue to increase its yearly attendance.

Even though there will not be an international congress this year, the Annual General Meeting (AGM) has taken place and results of it and the IAH Council Election will be made available in the next IAH newsletter. The primary outcome is that our own Dave Kreamer has been elected President of IAH. Please send Dave a note of congratulations and wish him well as he begins to lead our international organization for the next four years.

The USNC will hold its biannual meeting about the same time as we usually do in coordination with the time of the virtual GSA Annual Conference toward the end of October. Our meeting is open to all members and we encourage you to attend to learn more about USNC activities and/or how to become more active in the organization. Please follow our website at iah-usa.org for details on the date, place, and time.

With regards to involvement, we particularly encourage young professionals to become more active. To this end we are also trying to expand their ranks. Andy O'Reilly with the help of Jenny Pittman led the effort to compile a list of well qualified graduate students as candidates to receive one-year memberships in the USNC. Four of those young professionals have contributions in this newsletter about the projects they are working on. Several of them will be graduating in the near future and will be excellent candidates for jobs with your consulting companies, universities, or industries.

They represent future leaders of our organization and are automatically eligible to participate in the Early Career Hydrogeologists Network (ECHN). Please keep them in mind as you look to hire new employees.

Speaking of ECHN, the USNC's team of young professionals is continuing its efforts to expand membership. They are also looking for volunteers to serve as liaisons for the Geological Society of America (GSA) regional section meetings. Rory Cowie has taken Adam Milewski's place as President and is meeting with new officers and members to plan for 2021. Please let Rory know if you are interested in taking a leadership role or participating on various committees. Look for the details on these and other activities on their Facebook page (ECHN USA IAH), or their website (echn-usa-iah.org).

Tim Parker is continuing to represent the USNC with the American Geosciences Institute (AGI). The IAH USNC is an Associated Society of AGI and, as such, our members are eligible for discounts at AGI-sponsored functions and on AGI products. Please take advantage of this benefit. Another benefit IAH has added recently is a reduced subscription price for the journal "Sustainable Water Resources Management", published by Springer (www.springer.com/40899). A 20% discount is now being offered to members. Jim LaMoreaux and Cliff Voss are Editor and Associate Editor, respectively.

Continuing to expand our contacts in the Americas we have recently been reaching out to Joanne Thompson, IAH Vice President for North America, Diana Allen, President of the IAH Canadian National Chapter, Carmen Julia Navarro, President of the IAH Mexican National Chapter, and Carlos Molana, IAH Vice President for Latin America and the Caribbean. . Former USNC President Mike Wireman is helping professionals in Cuba investigate the possibility of forming a Cuban National Chapter. Former USNC President Vic Heilweil is making contacts virtually in South America for the USGS. These combined activities have the goal of possibly organizing an IAH Congress in the Americas in the future. If you are interested in or have contacts that would help further develop this outreach so that we could organize an IAH Congress in the Americas, please let us know.

As you can tell from this "Note from the Chair," many people are involved in keeping your national chapter running efficiently. I would like to thank all those mentioned above and many others for their efforts on the USNC's behalf. Let's keep working hard to make the rest of our year successful. Visit the USNC website at iah-usa.org to see how you can become more active. Please share this newsletter with your friends and colleagues and encourage them to become members and thank Gary Robbins for serving as our editor.

Stay safe and healthy,

Jim

Wanted Articles About You

As the editor of the newsletter, I need your help. Our newsletter is all about informing you of what the organization is doing and providing you with other news in our field that you may find useful. Of course all that is interesting. But it is also an opportunity to get to know each other, to network and to further bond in our mutual love of this field. So I am asking you to help with the next newsletter. Send me a picture of you working with a brief description (name, company, where the picture was taken and what does the picture show you doing). Send me a brief article about some interesting place you are working or visited related to hydrogeology. Have some interesting groundwater related picture or story? Send that with a description of who took the picture and where. How about a brief article about you for our Members News Section (see below)? Send material to Gary.robbins@uconn.edu.

IAH International News

IAH Karst Commission Event News 2021

The International Year of Caves and Karst, 2021, will be a busy year for karst hydrogeologists and scientists in general. With the postponement of some of the events originally planned for 2020, we will have at least 6 major events in 2021 that will deal entirely or partially with karst hydrogeology. As in every IAH Congress, there will be karst hydrogeology sessions in both events.

We would like to remind our members and friends that the Karst Commission official meeting in 2021 will take place during the Eurokarst 2021, in Malaga, Spain. During the Eurokarst 2021 we will host our 50th anniversary ceremony. Check information in the "Events" section.

Hydrogeology Journal Special Karst Issue

We have received approximately 30 manuscripts for the Special Issue of Hydrogeology Journal, celebrating the 50th anniversary of the Karst Commission. These manuscripts are now under review. The papers will be published online as soon as they become ready.

We are pleased to announce that the first paper, by our member John Gunn, has just been published. Check it out at: https://link.springer.com/article/10.1007/s10040-020-02206-x

Once all papers are properly accepted, the complete Special Issue will be published (online and in print). This is expected to occur in early 2021.

Chinese Edition of "Karst Aquifers - Characterization and Engineering"

The book "Karst Aquifers - Characterization and Engineering", edited by our co-chairman Zoran Stevanovic and published by Springer in 2015, will soon be published in Chinese.

The translation of the 700 page long book has now been completed. The book should be published in the coming months. This important book contains chapters by several of our members. It should be very useful for the rapidly growing community of Chinese karst hydrogeologists.

Forthcoming Events

Course

SISKA will organize a Visual KARSYS course via Webex in 2 sessions of 3 hours each. Dates for the course are September 16th and 17th. Any questions ask arnauld.malard@isska.ch. For more information on the course and detailed program see: https://www.dropbox.com/s/dxwjn2mm83ebyhh/Virtual%20KARSYS%20Sept%202020.pdf?dl=0

Conference

The 16th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst (known simply as "The Sinkhole Conference") is a traditional meeting that has taken place since the 1980's. In 2021 it will take place between April 12-16 in San Juan, Puerto Rico. There will be several short courses, field trips and presentations related to karst hydrogeology.

Further information can be found at: http://www.sinkholeconference.com/

EUROKARST 2021

Arguably, the most traditional karst hydrogeology meeting, the Eurokarst 2021, the European Conference on Karst Hydrogeology and Carbonate Reservoirs, will take place in Malaga, Spain, in June 22-24. This conference will be the 2021 official meeting of the Karst Commission.

18th INTERNATIONAL CONGRESS OF SPELEOLOGY

This congress is held each 4 years and in 2021 will take place in Savoie Mont Blanc, France, between July 25 - August 01. Many activities are planned, including a symposium on Karst Hydrogeology, organized by Anne Johannet, Bernard Collignon, Arnaud Malard and Alexandre Zappelli.

For more information go to the event website at: https://uis2021.speleos.fr/

Contributed by Augusto Auler

Message from VP North America

Hello everyone,

I would like to start by saying that I hope you and those you care for are healthy and remain so during this unimaginable Covid 19 pandemic. The situation has been challenging for so many individuals, businesses and organizations, including the IAH.

As you are likely already aware, the Brazil Congress scheduled for September 2020 in Sao Paulo was to be a major event with multiple organizations involved and a large trade show. This was not an easy thing to simply 'cancel and reschedule', and the conference organizers and the IAH Council carefully evaluated options. The decision was to move the date to August of next year (22-27 Aug 2021). The Belgium Congress will also move forward with their planned dates in September (6 – 10 Sep 2021). While not ideal to have to hold two Congresses in one year, this was the best option to try to minimize planning disruptions. Brazil and Belgium are coordinating efforts and will be looking to create opportunities for people to participate.

Many meetings and events have had to go online, and this was the case for the IAH's Annual General Meeting for 2020. The 2020 Annual General Meeting was held online at 1400 BST on 23rd September 2020. [Editors note: Sadly Joanne has relinquished her VP role. Her fellow Canadian Grant Ferguson was elected as our New NA VP. Congratulations Grant].

It is important that everyone remain vigilant in following health and safety protocols to stop the spread of this virus, such that hopefully at some point we can again gather together, face to face, at our Congresses, regional meetings, and local events. I look forward to the time when we will all meet again.

Stay healthy,

Joanne

joannethompsoniah@gmail.com

A Note from the IAH Vice President for Science and Program

Hope you all are well and healthy. IAH continues to move steadily along, in spite of the pandemic, with elections of IAH Council Members going on (we have excellent candidates for VP North America), two IAH Congresses scheduled for next year in Brazil and Belgium.

Many IAH Commissions, Networks and Working Groups are moving forward. For example, the new Groundwater Quality

Commission is working toward a theme issue in the journal, Science of the Total Environment, the new Socio-Hydrogeology Network has been invited to host a special issue in the Journal Water on that topic, and the Working Group on the Frontiers and Future of Hydrogeology just published a chapter on "The Future of Groundwater Science and Research" in the upcoming book, Global Groundwater published by Elsevier.

Please contact me if you would like more information on any of the upcoming IAH international efforts and activities. Stay well.

Contributed by David Kreamer

COVID/Groundwater News

COVID Water Utility Economics

It's generally understood that the coronavirus can't get into the water that we drink. But it can get into the finances of the utilities that get the water to us.

ITEM: The paying customers for more than half of all piped water -- colleges, offices, restaurants and factories — have cut back or shut down, thereby reducing water consumption and associated water revenues.
ITEM: Laid-off residential consumers across the country have gone delinquent on their water bills, magnifying the revenue problem.
ITEM: The homebuilding industry has softened, meaning few new connection fees from new homes.
ITEM: Capital spending and badly-needed repairs to leaking pipes have been deferred.

In recent months trade groups for the nation's thousands of water utilities have been studying the impact of the pandemic on their operations.

To read the rest of the blog, visit their website.

Covid-19 Crimps Stream Water Testing Of Dams

Over the decades federal and state agencies have set standards for water quality in lakes, streams and rivers, and they rely on routine water testing to stay on top of things.

Commonly these government agencies, along with non-profit lake associations and watershed groups, send out teams of two or three people to test water quality and then send samples to laboratories for further analysis.

Depending on location, sample-collectors can face moderate hazards – up around where I live in New Hampshire they include poison ivy and ticks. Those threats are manageable.

But what happens when the hazard is a dread disease for which there is no cure?

In some states this spring and summer, water quality monitoring in lakes and streams by government staff has been suspended or curtailed. And in other situations non-profit watershed groups have either stopped sending out volunteers or otherwise insisted that the teams that go out are comprised of only people who live together.

Adjusting to the coronavirus has been a job. Here's an excerpt from a report by New Hampshire's Department of Environmental Services, which ordinarily oversees a robust monitoring program in lakes and streams:

"(Protecting against Covid-19) meant reconfiguring the lab where thousands of samples are processed each summer, obtaining sanitizing agents, masks, and putting in place limitations on shared vehicle use…Lake and river sampling by staff was reduced by one-third overall. Fecal bacteria monitoring for approximately 80 freshwater beaches was suspended pending further consideration, and aquatic plant services were cut in half…

To read the rest of the blog, visit their website.

Information About Water Resources & COVID-19

Looking for more information about water resources and COVID-19? The Water Education Foundation has put together a list of resources and background information to keep you updated. Visit their website: https://www.watereducation.org/covid-19?utm_campaign=&utm_medium=email&utm_source=bundle_and_blast&mc_cid=364c6ceb37&mc_eid=8071e88ccb.

Contributed by T. Parker

COVID-19 Geoscience Impact Resources

Interested in the impacts of COVID on Geosciences then search COVID on the AGI website (https://www.americangeosciences.org/). As of this writing there are some 23 links to articles covering a whole range of related topics from academics to different business sectors. Also these societies have developed and are developing reports on the impact to their membeships: Association for Women Geoscientists; Association of Environmental & Engineering Geologists; Karst Waters Institute; National Cave and Karst Research Institute; National Earth Science Teachers Association; and the Society of Exploration Geophysicists.

Other Groundwater News

Springer Nature Launches "Discover Wate Springer Nature launched "Discover Water", a brand new open access journal, as part of their Discover journal series. "Discover Water" publishes research from across all fields relevant to the science and technology of water research and management. The journal covers not only research on water as a resource, for example for drinking, agriculture and sanitation, but also the impact of society on water, such as the effect of human activities on water availability and pollution. As such it looks at the overall role of water at a global level, including physical, chemical, biological, and ecological processes, and social, policy, and public health implications. It is also intended that articles published in Discover Water may help to support and accelerate United Nations Sustainable Development Goal 6: 'Clean water and sanitation'.

Speaking of the journal, the Editor-in-Chief Jim LaMoreaux says:

"Discover Water's aim is to bring to the fore a broad range of water-related topics for discussion in a scientifically reviewed forum. By streamlining the peer review process the journal aims to make crucial research on all aspects of water available to a global audience as rapidly as possible."

Why you should consider publishing in Discover Water:

· The journal's streamlined submission process ensures a swift turnaround time to publish your research rapidly while maintaining the highest peer-review standards.

· As a fully open access journal, it ensures that your research is highly discoverable and instantly available globally to everyone.

· Discover Water provides you with an excellent support service at every stage to guide you through the whole submission, review and publication process.

· All Discover journals uphold the ethical standards for research and publication as defined by COPE, and support authors in adhering to these throughout the peer-review process.

The Discover journals series will consist of up to 40 new open access titles covering topics from across the full range of applied science, physical, life, medical and social science disciplines. The series puts the author at the heart of the publication process and aims to publish manuscripts 7-10 weeks from submission - whilst maintaining the high levels of research integrity expected of any Springer Nature title.

Find more information on "Discover Water" here and please contact the journal editors if you have any questions.

Contributed by J LaMoreaux

The Groundwater Project

The Groundwater Project was created in 2017 under the leadership of John Cherry and managed by a 10-member international Steering Committee. It was originally designed to develop and provide a successor to the highly respected textbook "Groundwater" by Freeze and Cherry but has grown far beyond that early vision. As described on their web site (https://gw-project.org/), The Groundwater Project will provide accessible, engaging, high-quality, educational materials, free-of-charge online in many languages, to all who want to learn about groundwater and understand how groundwater relates to and sustains ecological systems and humanity. The Groundwater Project, a non-profit organization, is committed to contribute to advancement in education by creating and making available online free high-quality groundwater educational material for all—an evolving platform for groundwater learning. Their current effort is focused on producing online books that have undergone rigorous reviews and editing. More than 300 groundwater professionals from academia, industry, and government are writing over 200 books (chapters) in support of The Groundwater Project's mission. About a dozen books will be released by the end of 2020, and another 40 by the end of 2021. Three are currently available as of late August ("Groundwater in Our Water Cycle"; "Hydrogeologic Properties of Earth Materials and Principles of Groundwater Flow"; and "Graphical Construction of Groundwater Flow Nets"). Check out their web site for more information and updated links to available downloads.

Contributed by L. Konikow

Groundwater for Refugees

According to the IGRAC (International Groundwater Resources Assessment Centre) web site, millions of people worldwide have been forced to flee as a result of persecution, conflict, violence or human rights violations. Most refugees are hosted by the least developing countries where access to water and sanitation is already a challenge. IGRAC has a project about collecting, processing, and making available information relevant for groundwater assessment in regions with refugees or regions prone to conflict.

In emergency situations, water is one of the basic needs to be provided for refugees. The U.N. Refugee Agency, UNHCR, supported by the University of Neuchâtel (CHYN) is preparing a manual specifically for rapid assessment of groundwater resources. It includes the use of satellite imagery, geological maps, and fracture analysis, as well as morphological analysis combined with assessment of potential groundwater recharge patterns. The aim of the manual is to guide in

identifying the suitable locations for further geophysical investigations and ultimately to drill for water.

Since January 2020, IGRAC, UNHCR, and University of Neuchâtel have intensified cooperation, focusing on a pilot area in Western Africa. Next to remote-sensing based hydro-geomorphological analysis, various proxy parameters are tested for their possible role in assessment of groundwater potential at the local scale. Once the pilot is developed, it will be disseminated and promoted in order to be replicated elsewhere. More information is available on the IGRAC web site at https://www.un-igrac.org/

Contributed by L. Konikow

IWRA Conference *"Addressing Groundwater Resilience Under Climate Change"*

IWRA's upcoming Online Conference on *"Addressing Groundwater Resilience Under Climate Change"* will be held on 29-30 October 2020. See links below for information.

- **IWRA website:** www.iwra.org/onlineconference
- **Twitter:** https://twitter.com/iwra_water
- **Facebook:** www.facebook.com/iwrawater
- **LinkedIn:** www.linkedin.com/company/international-water-resources-association
- **Instagram:** www.instagram.com/iwra_water

Contributed by I. Deregibus

NGWA Groundwater Week

The National Ground Water Association's (NGWA) annual Groundwater Week (GWW) is scheduled for December 8-10, 2020. NGWA is monitoring the COVID-19 pandemic daily, and the top priority is the health and safety of GWW event participants. NGWA currently plans for the GWW 2020 to take place as scheduled in Las Vegas, Nevada, but now as a hybrid event to deliver GWW content both in-person as well as virtually. Keynotes include Kevin McGinnis, the 2021 McEllhiney Lecturer; Jeff Williams, the 2020 McEllhiney Lecturer; Alfonso Rivera, Ph.D., Chief Hydrogeologist, Geological Survey of Canada; Redd Maxwell, Ph.D., the 2020 Darcy Lecturer; and Jonathan Martin the 2020 Birdsall-Dreiss Lecturer.

Events include Exposition Hall, a wide array of educational and networking opportunities, pre-GWW workshops on drilling and groundwater geochemistry reaction modeling, and post-GWW workshops on PFAS and geochemistry. Since 2004, the Groundwater Summit, now a component of GWW, has been designed to be the premier scientific and engineering event for the groundwater community, and this year is no different except that all Summit content will be

delivered virtually. The Summit content focuses on the latest in research and knowledge, offers topics ranging from groundwater remediation and emerging contaminants including a session on PFAS, and groundwater sustainability including two sessions on managed aquifer recharge, plus any- and everything in between.

Contributed by T. Parker

Florida Gulf Coast University (FGCU) New Water School

IAH and ECHN's Rachel Rotz is a newly hired assistant professor at Florida Gulf Coast University (FGCU) as a hydrogeologist in FGCU's new Water School located in in the midst of Florida's complex freshwater and saltwater systems. The Water School focuses on interdisciplinary studies and brings together 16 different programs including marine and earth science, engineering, business, health, and psychology to work under one roof. The university just broke ground at the end of 2019 and plans to be finished by mid-2022. By taking a leadership role in this vital arena, FGCU acts as a catalyst for change in our community and throughout the world. The facility will be a comprehensive center for learning and research using a holistic approach that brings together water-focused faculty and students. For more information, check out: https://www.fgcu.edu/thewaterschool/ as well as the Water School video at: https://youtu.be/8X-1qqwJT6w

Contributor R. Rotz.

AGI News

COVID-19 Pandemic Study

The American Geosciences Institute is conducting a year-long study to understand how geoscience employers and educational institutions are changing their workplace and instructional environments in response to the COVID-19 pandemic, and to discover which of these changes will become permanent.

This survey is open to all geoscientists, including geoscience students, retired, and not currently employed, who reside in the United States, and are at least 18 years old.

Over the next 52 weeks, we will email a brief online status survey twice a month to each participant.

The information you provide will be valuable in helping geoscience academic institutions, geoscience employers and decision makers to understand the short-term and long-term structural impacts on the geoscience enterprise from the COVID-19 pandemic.

Results from the study will be reported only in aggregate and in a manner that ensures the confidentiality of the responses. Participation is voluntary, and you may discontinue your participation at any time.

For more information and to participate in the study, please visit https://www.americangeosciences.org/workforce/covid19.

If you have any questions or concerns about this study, please contact Leila Gonzales, who is the principal investigator for this study, at lmg@americangeosciences.org.

Funding for this project is provided by the National Science Foundation (Award #2029570). The results and interpretation of the survey are the views of the American Geosciences Institute and not those of the National Science Foundation.

Call For 2021 Nominations

Each year AGI sends out a call to its Member Societies for nominations for AGI Officers and Awards. Nominees will be reviewed and screened by the AGI Nominating Committees and passed on to the AGI Executive Committee and Member Society Council for final approval at their second quarter and spring meetings respectively. The nature and criteria for selection of candidates to be considered for officers and awards is outlined below. **The deadline for submitting nomination forms and supporting bio/backup material on candidates to AGI is February 1, 2021.** Nomination forms are available on the AGI web site to download. While nominations are requested from Member Society Representatives, nominations can be made by individual members of any Member Society. Nominations can also be submitted online by visiting the website: <**http://www.americangeosciences.org/awards**> and clicking on "Call for Nominations" at the bottom of the page.
AGI is seeking nominations for the following Executive Committee positions and awards:
AGI2021 Executive Committee Positions
President Elect (3-years- President Elect, President, and Past President cycle)
Treasurer (4-year commitment)
Member at Large (3-year commitment)
AGI2021 Awards
Medal in Memory of Ian Campbell for Superlative Service to the Geosciences
The Ian Campbell Medal is given in recognition of singular performance in and contribution to the profession of geology.
Marcus Milling Legendary Geoscientist Medal

This is given in recognition of (1) consistent contributions of high-quality scientific achievements and service to the Earth sciences having lasting, historic value, (2) recognized previously for accomplishments in field(s) of expertise by professional societies, universities, or other organizations, (3) senior scientist nearing completion or has completed full-time "regular" employment, and (4) living at time of selection and expected to personally accept the award.
Outstanding Contribution to the Public Understanding of the Geosciences
This award is given for a contribution or contributions that lead to greater public appreciation and better understanding of the role of geosciences in the affairs of our society. It will normally be given to one recipient per year. The award is presented to a person, organization, or institution in recognition of an outstanding contribution to the public understanding of geology. The contribution may be in geoscience as a science or as it relates to economic or environmental aspects of modern civilization. The award may be given to a geoscientist or non-geoscientist. or to an organization or an institution that is geoscience or non-geoscience in character.

Contributed by T. Parker

Member News and Notes

In Memoriam – Yoram Eckstein

Dear Friends,
I write with great sadness as my father, Yoram Eckstein, passed away on June 27, 2020. I know he made a great impression on many of you. But you also made a significant impression on him. He was especially proud of those he called “my students” and often kept track of their careers from afar.

In recognition of his 37 years of teaching, and more than 50 years of consulting and working in the industry in the US and around the world, we have established a memorial scholarship in his name in the Kent State University Geology Department. It is specifically designated for students pursuing a degree in hydrogeology. Through this scholarship, we hope to continue his legacy of producing rigorously educated and successful groundwater scientists.

We now ask all of you – many of his former students, colleagues from the field, clients at various companies, and friends – to contribute to this effort. Contributions are welcomed in any amount, and are tax deductible. To contribute, you can go to the following website and contribute online: http://ksu.convio.net/yorameckseinscholarshipfund. Alternatively, you can contribute by phone at 330-672-2222 or 330-672-4438, or by mail at KSU Foundation, P.O. Box 5190, Kent, OH, 44242. Please make sure to indicate that the contribution is directed specifically to fund #13871 - the Yoram Eckstein Memorial Scholarship Fund.

Thanks for your consideration.

With best regards,

Gabriel Eckstein | Professor of Law
Director, Energy, Environmental, & Natural Resources Systems Law Program
Texas A&M University School of Law| gabrieleckstein@law.tamu.edu

2019 International Service Award

Andy Manning presents ISA to Lex van Geen at Hydrogeology Division Luncheon and Awards ceremony.

Dr. Alexander (Lex) van Geen of the Lamont-Doherty Earth Observatory, Columbia University, was presented with the 2019 International Association of Hydrogeologists U.S. National Chapter's International Service Award at the Annual Meeting of the Geological Society of America, in Phoenix, AZ on September 24, 2019. The Award recognizes the efforts of hydrogeologists based in the United States who have shown an outstanding commitment to assisting the international community with groundwater-related needs. The presentation was made during the Hydrogeology Division Luncheon and Awards Ceremony. Lex received the Award in recognition of his critical work and leadership in studying the arsenic crisis in southern and southeastern Asia.

ECHN News

The ECHN has formed a new steering committee in 2020 with the departure of the former president Dr. Adam Milewski, Associate Professor in the Department of Geology at the University of Georgia. The new steering committee is introduced below.

President

Rory Cowie, PhD
President/Hydrologist
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Rory Cowie received his PhD from the University of Colorado and the Institute of Arctic and Alpine Research. Dr. Cowie's professional interests are focused on the processes controlling hydrologic fluxes in mountain regions and across greater earth systems. Specifically, he works on understanding surface water and groundwater interactions in natural and human altered environments. Dr. Cowie is interested in both the development of remediation strategies to improve water quality in disturbed settings and understanding how changing climate will impact natural resource management practices across various spatial and temporal domains. Dr. Cowie is the owner of Alpine Water Resources LLC in Silverton, CO and is currently

working with the US EPA, federal land agencies, and private stakeholders to remediate abandoned hard rock mines and address acid mine drainage issues in the San Juan Mountains of Colorado.

Racha El Kadiri is an assistant professor at Middle Tennessee State University. Her research focuses on a wide range of hydrological and environmental issues ranging from the assessment of climate change impacts on agricultural watersheds, the spatio-temporal evaluation of water-driven natural hazards such as landslides and floods and the prediction of coastal hazards such as algal bloom onsets and the long-term impact of hurricanes on water quality. Her research relies on the use of machine learning, remote sensing and geographical information systems to address the various research questions.

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Rachel Rotz is an Assistant Professor at Florida Gulf Coast University (FGCU) in Fort Myers, Florida within the Department of Marine and Earth Sciences. Her research focuses on variable-density groundwater environments, as well as the search for water in drylands on Earth and Mars. She received a bachelor's degree in Liberal Studies from the University of Central Florida and is a "Triple Dawg" with a bachelor's, master's, and doctoral degree from the University of Georgia. Rachel is actively involved with characterizing surface and freshwater interaction in basalt to understand water quality and quantity problems in Hawaii, as well as identifying potential sites of groundwater accumulation on Mars. She is also working to improve undergraduate STEM education under a newly awarded NSF GEOPATHS-EXTRA grant with her geology colleagues at FGCU to establish high-impact curriculum to attract and retain students in a new environmental geology program. Rachel is currently setting up her hydrogeology laboratory at FGCU and part of FGCU's new initiative, The Water School - an interdisciplinary center advancing water resources education and research for Florida and the southeastern United States.

Updates from the 2020 IAH-UNSC Sponsored Graduate Student Members

Graduate students who were awarded a sponsored 2020 student membership by the USNC have been busy this year. Below, several of our student members have provided updates about progress in their program or recent research. Take a read! Given everyone's current travel restrictions, this is a means to provide some networking opportunities for them. The future ohydrogeology looks bright!

In early November, we will be sending the call for nominations for 2021 sponsored student memberships. We are continuing to expand and correct errors in our email list, which is intended to include those working in the hydrogeology field in academia plus those in the public and private sectors who may work with and be interested in nominating a deserving graduate student. Jenny Pittman is continuing to add names from the AGI Directory of Geoscience. If you know of someone who would like to be on the email list, please let me know (Andy O'Reilly, aoreilly@olemiss.edu). The call will also go out to all USNC members; thus, you may receive duplicate emails—my apologies in advance for that, but it's the most reliable way to ensure we cast as wide a net as possible.

Contributed by A. O'Reilly

Claudia Corona, claudia.corona@colorado.edu, Department of Geological Science, University of Colorado Boulder
My name is Claudia Corona, I will soon be starting my 3rd year at UC Boulder. Like most others, my world was offset by by the pandemic. It does not help that my last name is "Corona", though at least jokes about beer and my last name have subsided…for now. This past spring semester, I was a teaching assistant for a Field Hydrogeology class, and I enjoyed the few weeks of outdoor trips we had making well measurements and seeing drilling demonstrations before we were forced to shift to remote learning. Even with the instability of the pandemic and my concerns for my family, who live in a pandemic "hot zone", I was able to pull it together enough to present my dissertation prospectus to my Ph.D. Committee. I am happy to report I have progressed to Ph.D. Candidacy!

Claudia hiking up a dune at Great Sand Dunes National Park.

The title of my prospectus is "Examining the Subsurface Response to Extreme Precipitation Events". The work is motivated by findings that extreme precipitation events (EPEs) play an increasingly crucial role in influencing groundwater resources. Climate forecasts suggest that EPEs could become more frequent and intense in the coming decades, thus highlighting the need to examine the effects of past EPEs on the subsurface so that we may better understand possible future effects on groundwater resources. However, most studies generally disregard subsurface flow above the water table, resulting in a lack of concrete understanding of the EPE-groundwater connection. The purpose of my project is to address the response of subsurface systems to EPEs using subsurface flow models. I am currently working on some model runs and aim to present my findings at the AGU Conference this year. I am happy to answer any questions, take any

suggestions or just talk with any fellow hydrogeologists that would like to connect. You can find me on LinkedIn: https://www.linkedin.com/in/claudiarcorona/, or follow me on Instagram: @clovy_corona.

Michael Gratzer, mcgratze@go.olemiss.edu, Department of Geology & Geological Engineering, University of Mississippi.
The final version of my paper from my thesis was published in March. It is entitled "Groundwater recharge from an oxbow lake-wetland system in the Mississippi Alluvial Plain" and can be found in Hydrological Processes (https://doi.org/10.1002/hyp.13680). Below is a short summary of the research.

Michael downloading data from a transducer in the northeast wetland of Sky

The Mississippi River Valley alluvial aquifer (MRVA) is the second most productive principal aquifer in the United States. To work toward sustainability of this resource, groundwater managers need better understanding of each term of the aquifer's water budget. Sky Lake is an oxbow lake in northwest Mississippi near one of the MRVA's largest long-term cones of depression. Various hydrological studies have been carried out at this oxbow over the past twenty years, some of which have suggested the potential for water in the lake and surrounding wetland to infiltrate the subsurface and even recharge the underlying alluvial aquifer. A study was recently completed to rigorously test whether recharge occurs from Sky Lake to the MRVA. A network of wells was installed: two in the wetland, three just outside the wetland, and six surrounding the oxbow. Groundwater levels in the two wetland wells and two of the wells near the wetland responded strongly to surface water level changes. Weaker responses occurred farther away from the wetland, except for two wells. In areas where the aquifer is confined by floodplain fines and oxbow clay plug, loading effects can cause rises and falls in the potentiometric surface without actual recharge or discharge. To determine whether this was occurring, the groundwater level was compared before and after the largest rise in groundwater level of the measurement period. The average increase from groundwater level at the eleven wells before the rise in December 2017 through May 2018 to groundwater level after recovery from the rise was 0.5 m, indicating that actual recharge occurred. Two recharge pathways are suggested by these results based on where the strongest responses were observed—in and near the wetland and in the meander scroll. We hypothesized that recharge in the wetland may be conveyed by preferential flow paths formed by dead cypress tree limbs and root systems. We hypothesized that recharge in the meander scroll was conveyed by coarse meander scroll sediments that become inundated when the oxbow overflows its banks. A waterborne resistivity survey on the lake indicates that coarse sediments compose the inner bend of the lake and fine sediments compose the outer bend of the lake. Oxbow lakes of the MRVA may be an important recharge source especially when water levels are high in winter and spring.

Paula Perilla-Castillo, pperill1@vols.utk.edu, Department of Earth and Planetary Sciences, The University of TennesseI entered the *water resources world* about eight years ago when I graduated with a B.S. in Geology from the National University of Colombia and got my first job

in a hydrogeology and environmental geology consulting company. I had taken Hydrogeology as a class during my undergrad and was somehow familiar with the theory, but the job opened my eyes. I lived all my life in a city with not many water scarcity issues, I never truly imagined how bad water scarcity problems were in other regions. As part of my first hydrogeology job I had to travel to remote regions of my country, Colombia, to do an inventory of water structures such as wells and springs. The surveys changed my perspective on water availability. Water does not just come out of a tap, in some places it is a precious resource that you must work hard to look for and then keep clean to be able to subsist. Fast forward to 2020, I am entering the final stretch of my Ph.D. in the University of Tennessee and often think about how my perspective changed from just a task I did for my first job.

Paula examining a soil profile along the banks of the Tennessee River.

I am currently researching paleofloods and how the information they provide can help us improve our management of flood hazards in the present. I am in the process of writing my dissertation, getting my data organized and analyzed for publishing the papers I want to share with the scientific community. Writing has been one of the hardest tasks I have encountered so far. The fieldwork for my project was fun and challenging including long summer days collecting soil samples, measuring profiles, and navigating the Tennessee River. Processing the samples was time consuming but with a lot of learning along the way, how to manage my time better, how to be careful in a lab setting, how to keep records of my processes, and understand the results of the analyses. But writing and analyzing my results made me realize how complex our world is and how every bit of knowledge comes from deep thinking, hard work, and a lot of fear facing… Facing the fear of writing and being judged so I can learn how to better communicate my findings, facing the fear of putting my ideas out and helping them grow into grants to continue my journey through water resources, facing the fear of finding collaborators and work for the water community.

Paula collecting a soil sample from a bank of the Tennessee River.

Almost every day I see on the news how water can influence our lives, either excessive or scarce. I am thankful to belong to IAH and be part of the 2020 IAH U.S. National Chapter sponsored student membership, because it allows me to learn more about water every day, with the hope that sometime soon I will be able to conduct my own research and contribute to the knowledge of groundwater and water resources in general. My dream to be part of the hydrogeology academic world is not only fueled by my desire to contribute with knowledge to the scientific world, but also to teach everyone about the importance of water resources. Maybe one day my knowledge can reach people worldwide, people like the ones I met during my first job in hydrogeology in those remote regions of Colombia who struggled and needed guidance in protecting the water that guaranteed a significant part of their survival.

Katharine Sink, Katharine.Sink@UTDallas.edu, Department of Geosciences, University of Texas at Dallas

I recently submitted my research proposal and passed my qualifying exam. I am now a Ph.D. candidate. The title of my prospectus is "Anomalous runoff response along the hundredth meridian: causes of behavior and potential amplification in a changing climate."

Field Testing of Vadose-Zone Recharge Wells as a Method for Artificial Recharge of the Alluvial Aquifer in the Delta Region of Mississippi

Andy O'Reilly[1] and Kyungwon Kwak[1,2]

[1] University of Mississippi, Department of Geology & Geological Engineering

[2] now Ph.D. candidate at Texas A&M University, Department of Geology and Geophysics

The Delta region of the Lower Mississippi River Valley is an area of unique geologic and cultural origins lying within the Mississippi Alluvial Plain. The region stretches from southern Illinois to the coastal delta of the present-day Mississippi River in Louisiana and is the ancestral floodplain of the Mississippi River. The Mississippi Alluvial Plain is intensively farmed, making it one of the most important agricultural production regions in the United States. The Mississippi River Valley alluvial aquifer (MRVAA) supplies the vast majority of irrigation water. As a result, the region is one of the most heavily pumped in terms of groundwater use, exceeding 9 billion gallons per day, third only after the Central Valley aquifer of California and the multi-state High Plains aquifer. The portion of the alluvial plain within the northwest region of the state of Mississippi is popularly referred to as simply "the Delta" (Figure 1). The area is often considered the birthplace of the blues and other uniquely American musical genres. As is often the case, great creativity is born of great hardship—and the Delta is no exception. The existence and enduring legacy of slavery, sharecropping, segregation and racism toward African Americans and Native Americans along with the unpredictability of the Mississippi River itself brought extreme hardship to people living in the Delta. These conditions combined with immigrants from disparate locales around the world gave way an often paradoxical social and political structure that produced rich cultural traditions unique to the region. The National Park Services provides an informative summary of the history and culture of the region (https://www.nps.gov/locations/lowermsdeltaregion/history-and-culture-of-the-mississippi-delta-region.htm). More recently, groundwater availability has become a threat to the economic sustainability of the region.

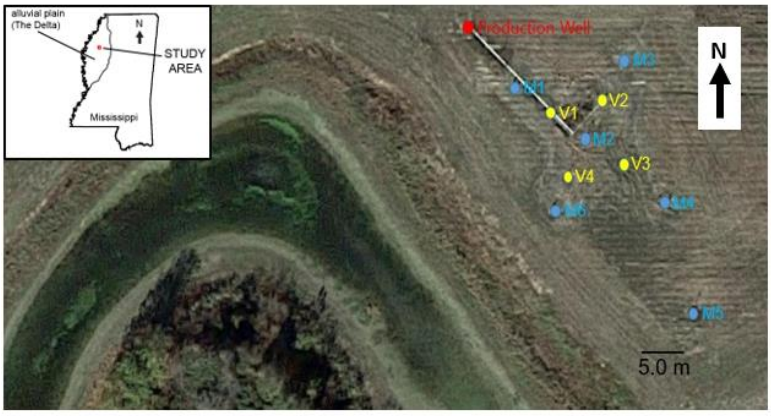

Figure 1. Study site location in the Delta region of Mississippi and well layout. Wells V1–V4 are vadose-zone recharge wells. Wells M1–M6 are monitor wells. The production well was used to provide water for the test.

Water withdrawals from the MRVAA support an agriculture industry in the Delta that produces over $1.5 billion in agricultural commodities annually, yet continuing decreases in aquifer water levels averaging 0.3 to 0.5 m/yr over the past 35 years indicate that current groundwater-use practices are unsustainable. Additionally, current and planned water conservation and irrigation best management practices are projected to not fully alleviate the long-term depletion of groundwater.

While being a major producer of food and fiber products, many communities in the Delta have historically suffered from pervasive and long-term economic depression, and continue to do so today. A predictable water supply would directly reduce the risk faced by agricultural producers by reducing uncertainty of one of their major determinants of success—water availability. Increased water security thorough sustainable management of the alluvial aquifer's water supply is needed to support, in part, a sustainable agriculture industry and economic opportunity in the Delta.

Artificial recharge using surface water is a potential management strategy to help provide a sustainable supply of groundwater in the Delta. The fluvial processes that formed the Delta deposited fine-grained, low permeability surficial sediments, substantially limiting the potential for infiltration and aquifer recharge to typically less than 5% (7.5 cm) of annual rainfall. An artificial recharge technique not dependent on permeable surficial soils is a vadose-zone well. A vadose-zone well is a borehole, which does not intersect the water table, excavated through low permeability surficial sediments and completed as a dry well into underlying higher permeability sediments. Water directed to the well flows by gravity into the native sediments of the vadose zone.

The purpose of this study was to perform full-scale field tests of vadose-zone wells in order to i) determine properties controlling well hydraulics such as aquifer hydraulic conductivity and unsaturated hydraulic properties, flow rate, and groundwater storage, and ii) assess feasibility of vadose-zone wells for artificial recharge of the MRVAA. Data were collected at a field site in northwest Mississippi, consisting of four 10-cm diameter vadose-zone wells, six monitor wells, and one production well (Figures 1 and 2). From pumping test data, transmissivity of the MRVAA at the site is 5,700 m^2/day and storativity is 0.33. The large transmissivity and storativity values confirm the highly productive and unconfined nature of the MRVAA.

Despite being considered an unconfined aquifer, a distinct inverse correlation existed between barometric pressure and water level in the monitor wells, indicating a barometric efficiency of approximately 60%. This unexpected phenomenon hampered identification of the effects of

Figure 2. Left: site layout looking southeast; Right: vadose-zone recharge well.

well recharge until recognized and corrected for. During a 50-hour test, water was pumped continuously into two vadose-zone wells and flowed by gravity into the vadose zone at rates ranging from less than 38 to 114 L/min (10 to 30 gal/min). Flow rates decreased over time, potentially due to nearing saturation of the portion of the vadose zone around the wells and flow impedance from trapped air bubbles preventing the sediments from fully saturating. Resulting recharge to the aquifer caused small water-table rises ranging from 4 cm at the nearest monitor well (well M2 at 6.1 m distance) to 1 cm at the most distant well (well M5 at 35 m distance). Theoretically, given the total volume of injected water of approximately 567 m^3 and a porosity of 0.35, a 40-cm (1.3 ft) rise in the water table would occur over an area of about 4,050 m^2 (1 acre). The small observed rises likely were due to one or more of the following factors: high hydraulic conductivity of the MRVAA, variations in sand/silt/clay lithology with depth, screen location of the monitor wells, or backpressure from air in the vadose zone being compressed as sediment saturation increases.

Laboratory analyses were conducted on soil cores collected from the vadose zone, including measurements of hydraulic conductivity and water absorption/retention characteristics. Wetting/draining curves were determined using the hanging water column method, representing some of the first measurements of capillary hysteresis in the Delta. The hydraulic properties of the vadose zone can be important factors affecting artificial recharge techniques that involve infiltration or direct injection.

This research provides understanding of the hydraulic properties controlling operation of vadose-zone wells. Results indicate vadose-zone wells can be useful and likely are feasible on a smaller scale for recharging the MRVAA in the Delta, especially given the relatively low cost of installation. However, given the limited flow rate for the small diameter wells, vadose-zone wells are not a practical option for mitigation of water-level declines over the entire Delta. Challenges include clogging leading to limited well life and potential water-quality impacts caused by water from the vadose-zone well bypassing natural treatment processes that occur in the shallow soil zone. To help mitigate drawdown on a larger scale, aquifer storage and recovery is being assessed. Pilot studies are currently underway in the Delta to determine the feasibility of pumping groundwater via riverbank filtration and delivering it to injection wells in the areas of greatest groundwater depletion.

2021 THE YEAR OF THE TWO CONGRESSESS

THE 47th IAH CONGRESS SAO PAULO, BRAZIL
August 22-27th 2021

For information: https://iah2021brazil.org/

THE 48th IAH CONGRESS BRUSSELS, BELGIUM
September 6-10th 2021

For information: https://iah2021belgium.org/

See you there or there or both!

Gary